

# Fecal Coliform Bacteria TMDL for Cedar/Licking Run



*Northern Virginia Regional Commission*

*Normand Goulet*

*July 10, 2003*

# ¿ Task at Hand ?

- Identify all sources of a given pollutant within the watershed.
- Calculate the amount of pollutant entering the stream from each source.
- Calculate the pollutant reductions needed, by source, to attain water quality standards.



# Technical Advisory Committee

- Fauquier County
- Prince William County
- John Marshall Soil & Water District
- Prince William Soil & Water District
- FSA and PWCSA
- Extension Service
- Fauquier County Agricultural Development
- Citizens for Fauquier
- Piedmont Environmental Council
- Virginia Department of Environmental Quality
- Virginia Department of Conservation and Recreation



# What's the Timeline?

- ✓ May 20, 2003 1<sup>st</sup> Technical Advisory Committee (TAC) meeting
- ✓ July 11, 2003 1<sup>st</sup> Public meeting
- September, 2003 2<sup>nd</sup> TAC meeting
- October 23, 2003 2<sup>nd</sup> Public meeting
- November, 2003 3<sup>rd</sup> TAC meeting
- January, 2004 3<sup>rd</sup> Public meeting: Present Draft Report
- May, 2004 Submit Report DEQ/EPA



# Cedar and Licking Run TMDL Development

## Locations



Select your application here Impaired Waters (303D Data)

*Navigation*

**FULL STATE VIEW**

**ZOOM IN**

**ZOOM OUT**

**PAN**

*Select from Active Theme*

**SELECT FEATURE**

**FIND**

*Additional Tools*

**SEARCH ADDRESS**

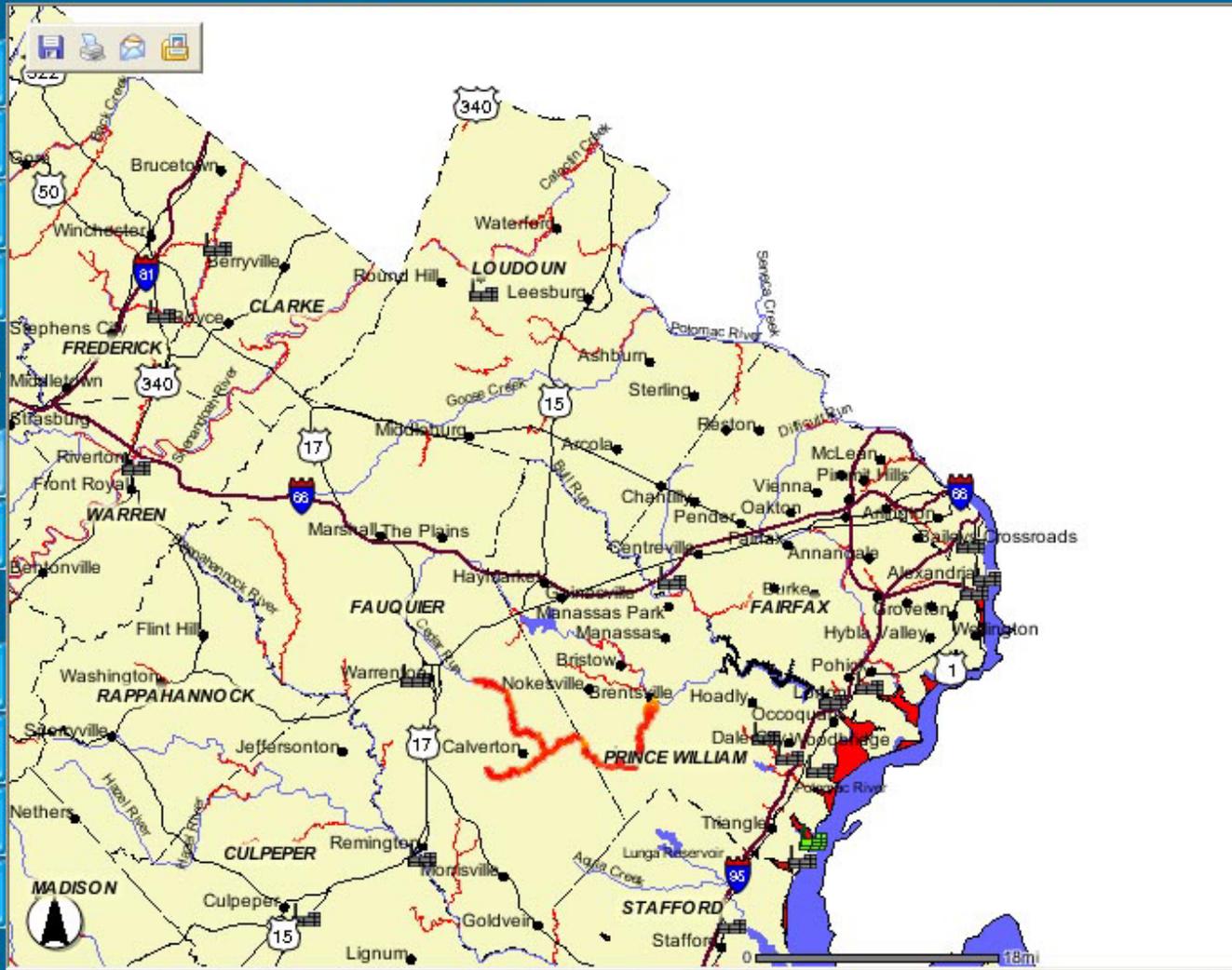
**MEASURE**

**CLEAR SELECTION**

**PRINT MAP**

*Help*

**HELP**



**Refresh Map**

Click on a layer below to make it active

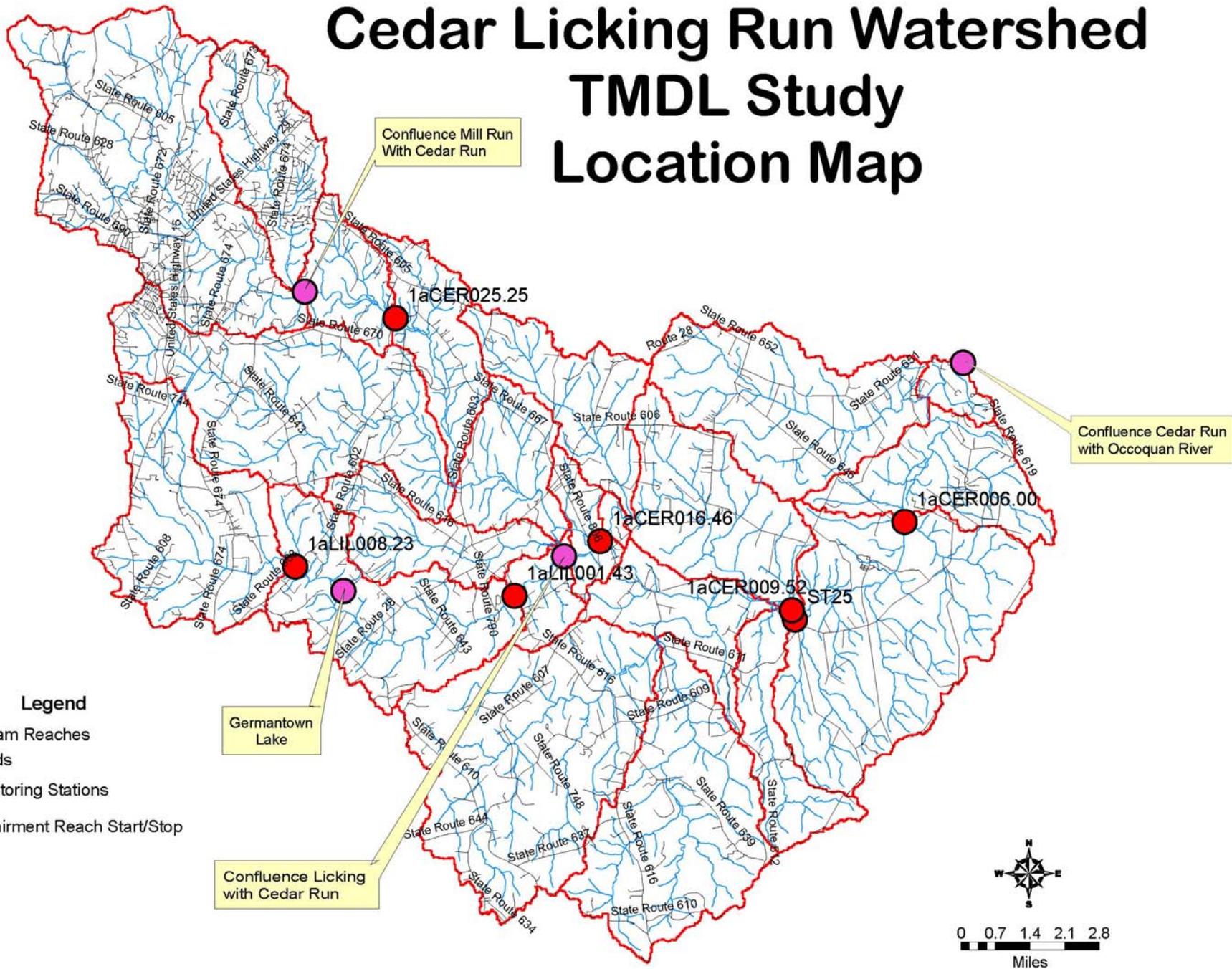
**Visible Legend**

- Major Dischargers
  - Industrial
  - Municipal
- Monitoring Stations
  - Ambient
  - Citizen
  - Federal
  - Fish Tissue
  - Biological
  - Ambient
  - Ambient/Bio
  - Fish/Bio
  - Ambient/Fish/Bio
- Impaired Rivers and Streams**
- Impaired Lakes**
- Impaired Estuaries**
- Waterbody Basin

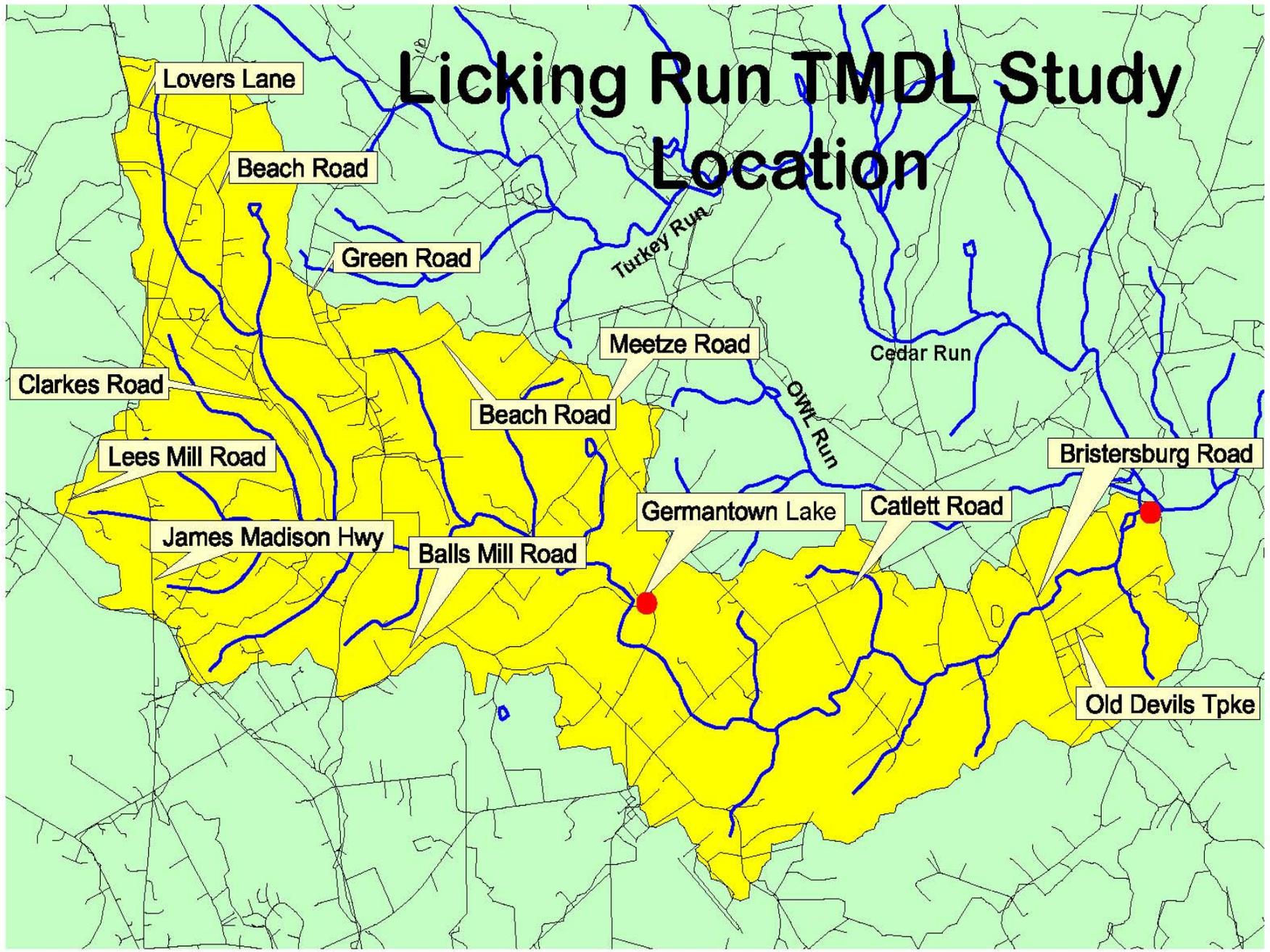
CLICK FOR FACTSHEET	TMDLMAPID	NAME	SOURCE	CAUSE	SIZE	BASIN
<a href="#">1</a>	VAN-A17R-02	Licking Run	Fecal Coliform	Unknown	6.58 - Miles	POTOMAC AND SHENANDOAH RIVER BASIN
<a href="#">2</a>	VAN-A17R-01	Cedar Run	Fecal Coliform - 5.94 miles, Fecal Coliform - 22.29 miles	Unknown	28.23 - Miles	POTOMAC AND SHENANDOAH RIVER BASIN

**Current Tool: Select Rectangle**

# Cedar Licking Run Watershed TMDL Study Location Map



# Licking Run TMDL Study Location

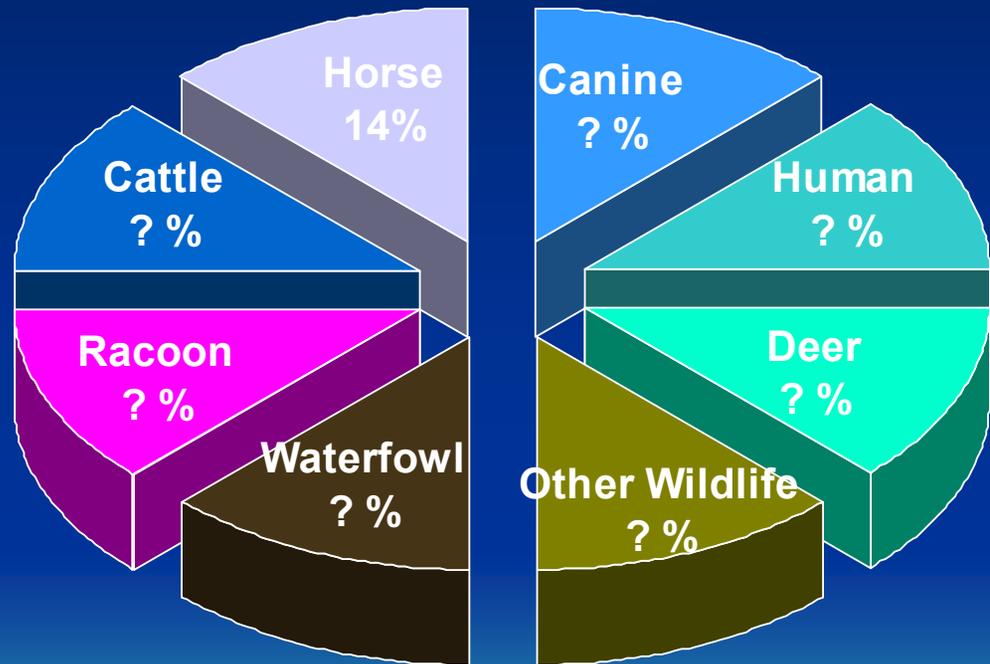


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# Bacteria Sources in Cedar / Licking Run ?????



# Cedar and Licking Run

## TMDL Development

### Biological Source Tracking (BST)



# DEQ Bacteria Source Tracking (BST) Study Objectives

- Simultaneous enumeration of E. coli and Fecal Coliform in ambient water samples
- Collection of samples from known sources
- Antibiotic Resistance Analysis (ARA) of known samples to build a source library
- Identification of sources contributing to each ambient sample using ARA and comparing results to the source library



# BST Study on Cedar and Licking Runs

- Monthly sampling for both *E. coli* and Fecal Coliform began at 6 stations in August 2002
- 12 samples will be collected at each station
- DEQ collects ambient samples and ships them to MapTech's Environmental Diagnostics Laboratory (EDL) for analysis
- Upon completion of the BST Study, the Fecal Coliform standard will no longer apply



# BST Study Stations

Station ID	Location	County	Latitude	Longitude
1aLIL001.43	Rt. # 616	Fauquier	38° 37' 15"	-77° 39' 30"
1aLIL008.23	Rt. # 663	Fauquier	38° 37' 48"	-77° 44' 25"
1aCER006.00	Rt. # 646 BRIDGE	Prince William	38° 38' 29"	-77° 30' 44"
1aCER009.52	Rt. # 611	Prince William	38° 36' 57"	-77° 33' 17"
1aCER016.46	Rt. # 806 BRIDGE	Fauquier	38° 38' 12"	-77° 37' 34"
1aCER025.25	Rt. # 602 BRIDGE	Fauquier	38° 42' 9"	-77° 42' 7"

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# TMDL Model Choice?

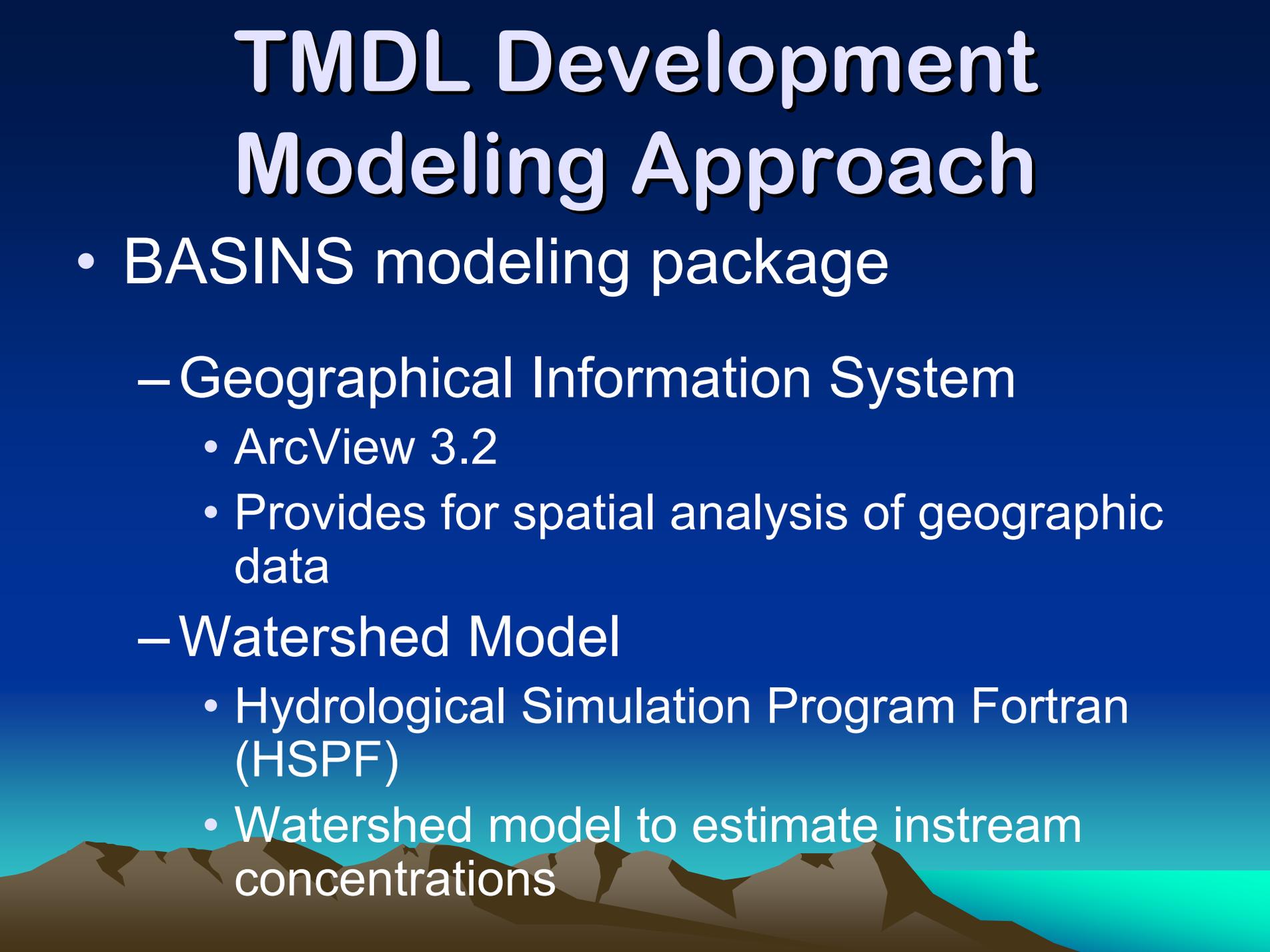
EPA “encouraged” Nationwide Approach.....

EPA BASINS Modeling Package

**B**etter **A**ssessment **S**cience  
**I**ntegrating **P**oint and **N**onpoint  
**S**ources



# TMDL Development Modeling Approach

- BASINS modeling package
    - Geographical Information System
      - ArcView 3.2
      - Provides for spatial analysis of geographic data
    - Watershed Model
      - Hydrological Simulation Program Fortran (HSPF)
      - Watershed model to estimate instream concentrations
- 

# TMDL Study Modeling Approach

- Geographic Data
  - Streams and Reaches
  - Soils
  - Digital Elevation
  - Land Use
  - Roads and Highways
  - US Census Data



# TMDL Study Modeling Approach

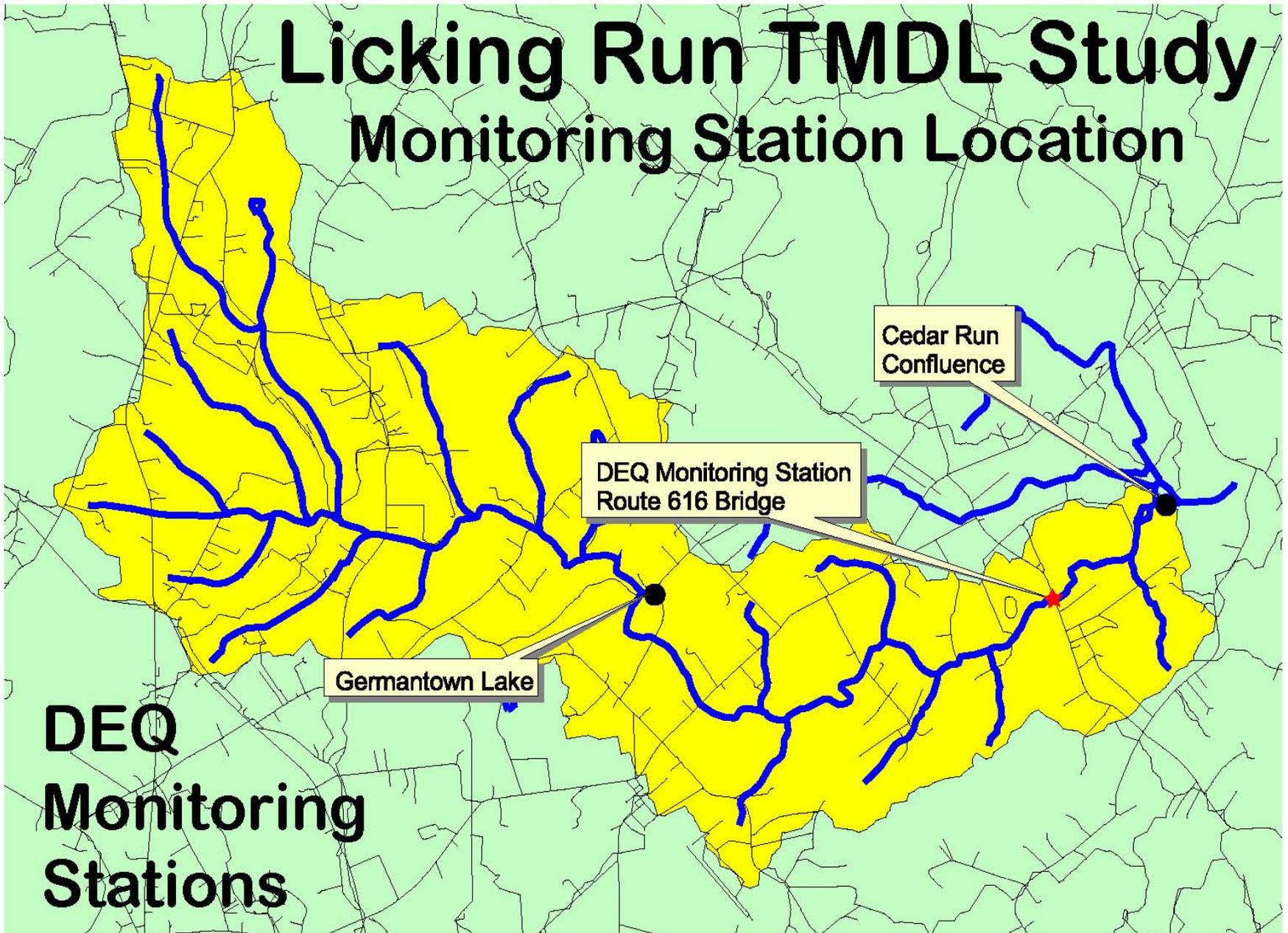
- Watershed Model
  - Estimation of NPS loadings from mixed land uses
  - Estimation of fate and transport processes
    - Requires:
      - Land Use
      - Soil Data
      - Reach Data
      - Meteorological Data
    - Water Quality Data

# Cedar and Licking Run TMDL Development

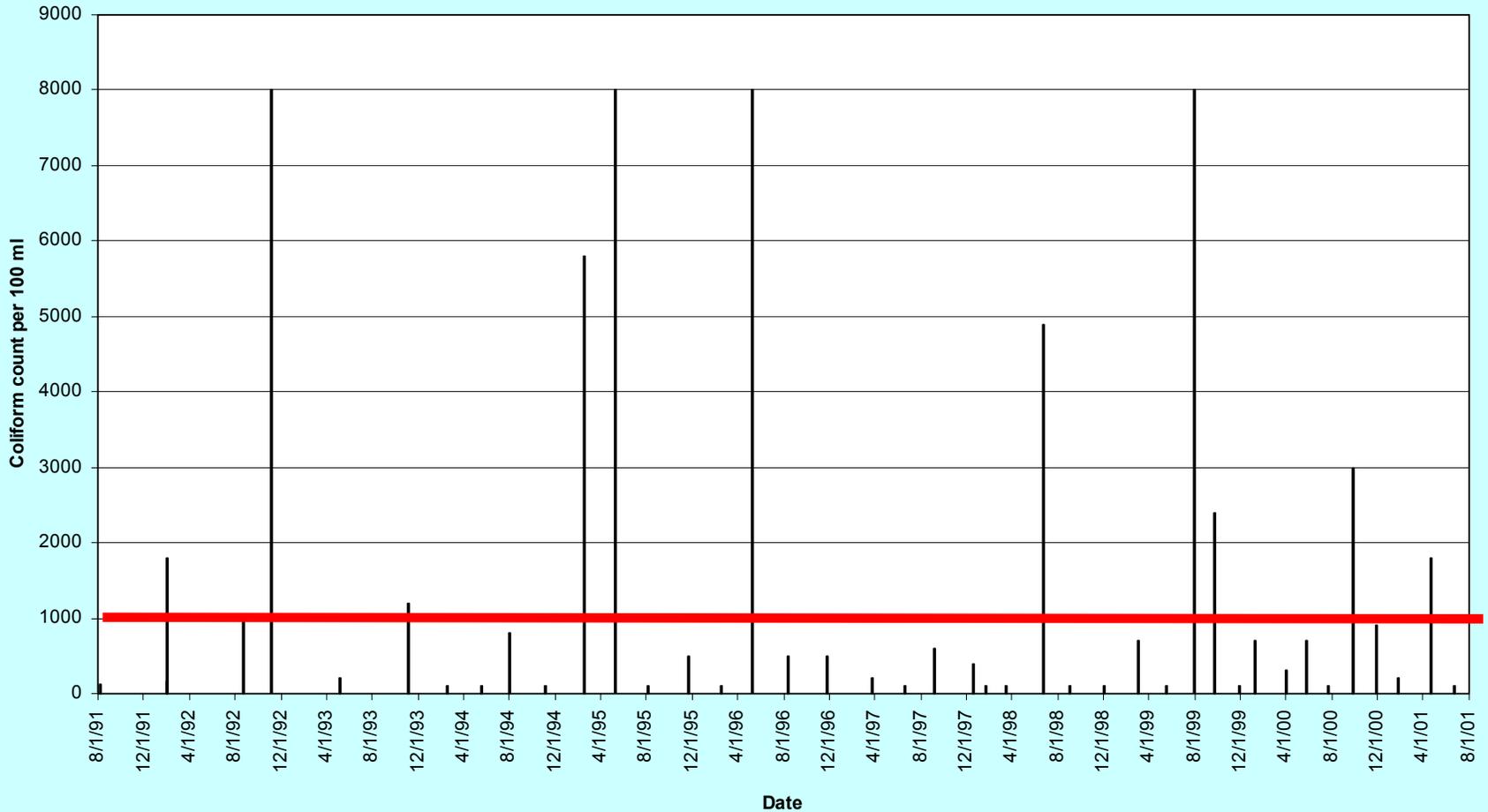
**Water Quality  
Monitoring**



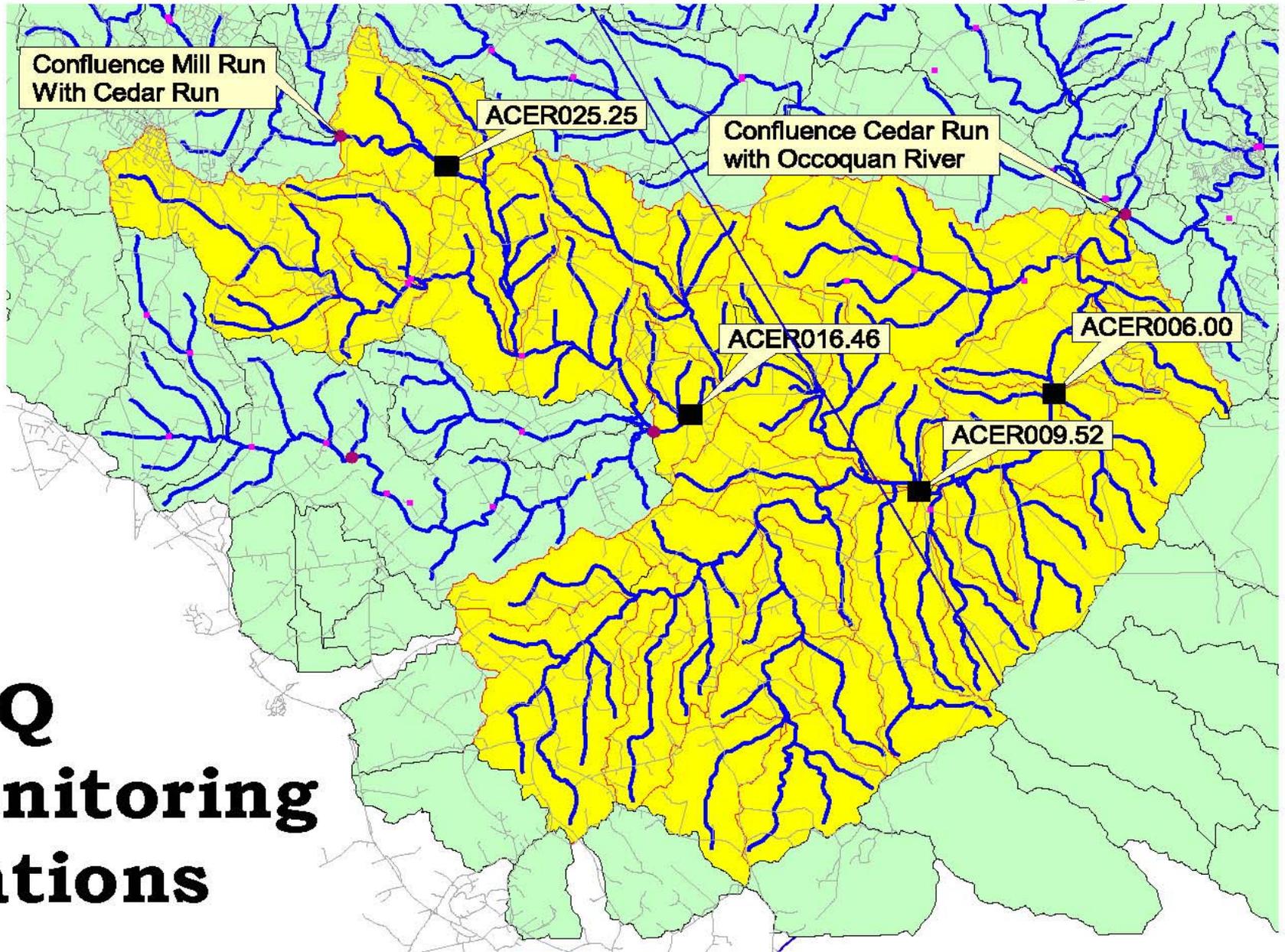
# Licking Run TMDL Study Monitoring Station Location



# DEQ Monitoring Data Station 1ALIL001.43 Licking Run

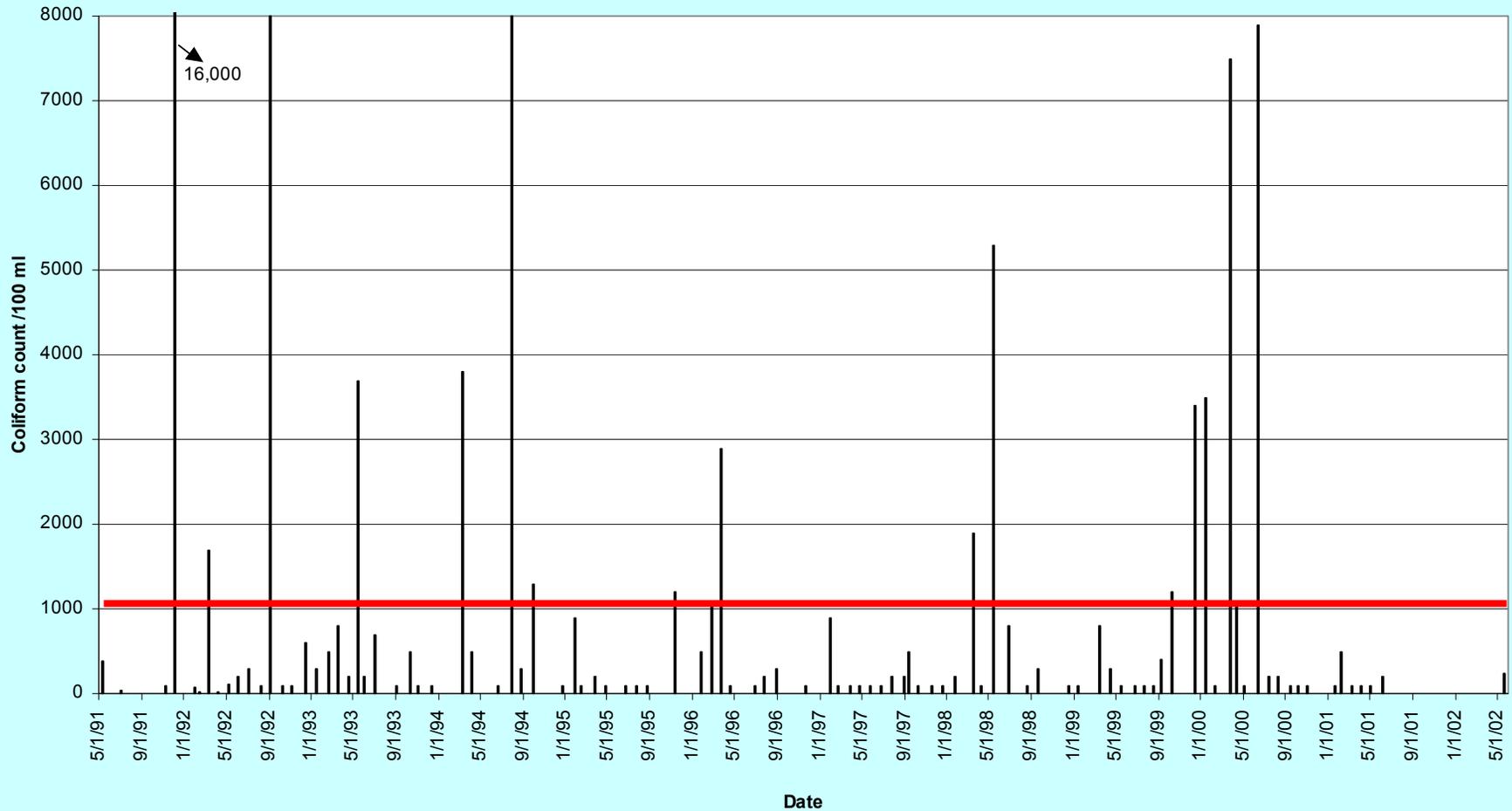


# Cedar Run TMDL Study

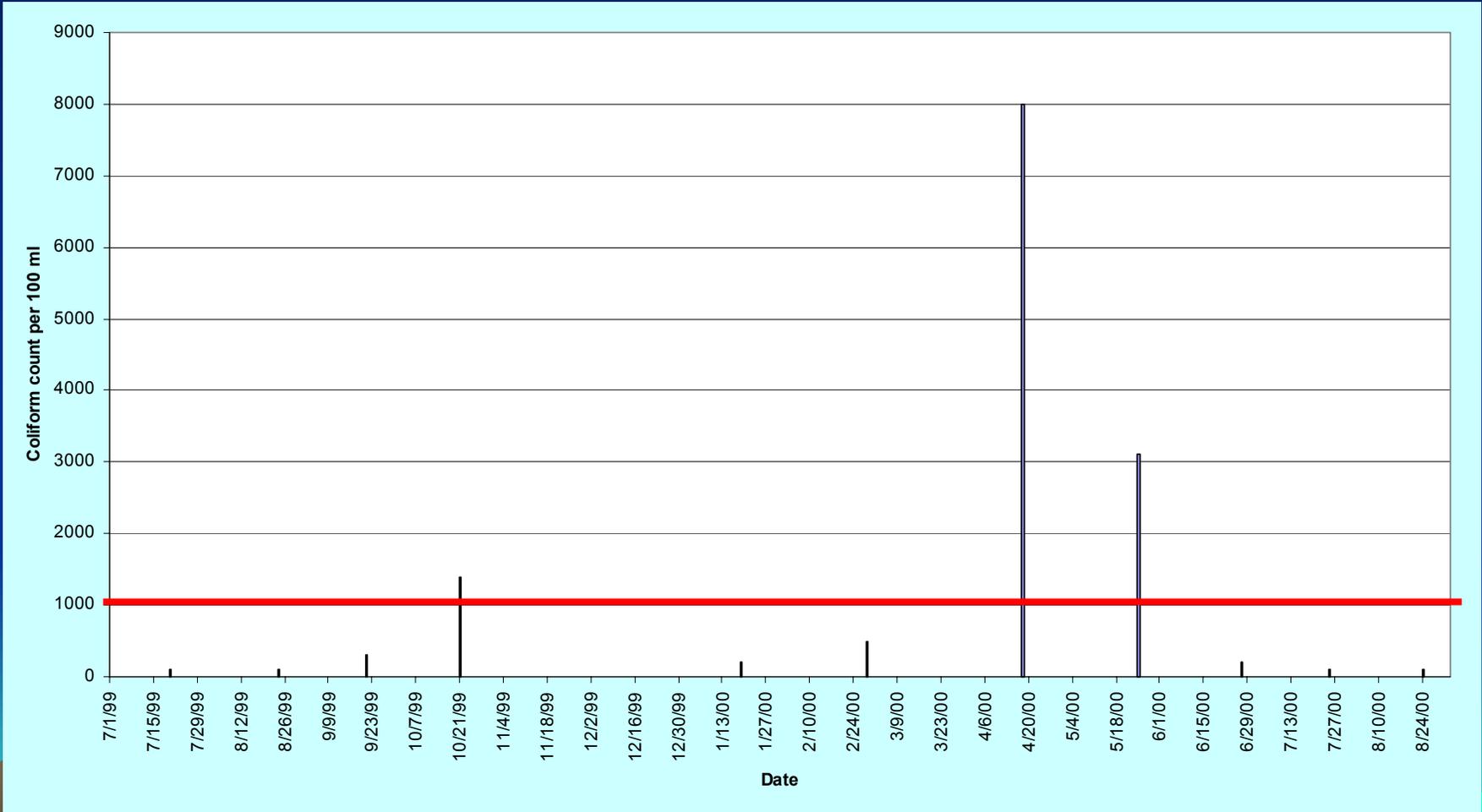


**DEQ  
Monitoring  
Stations**

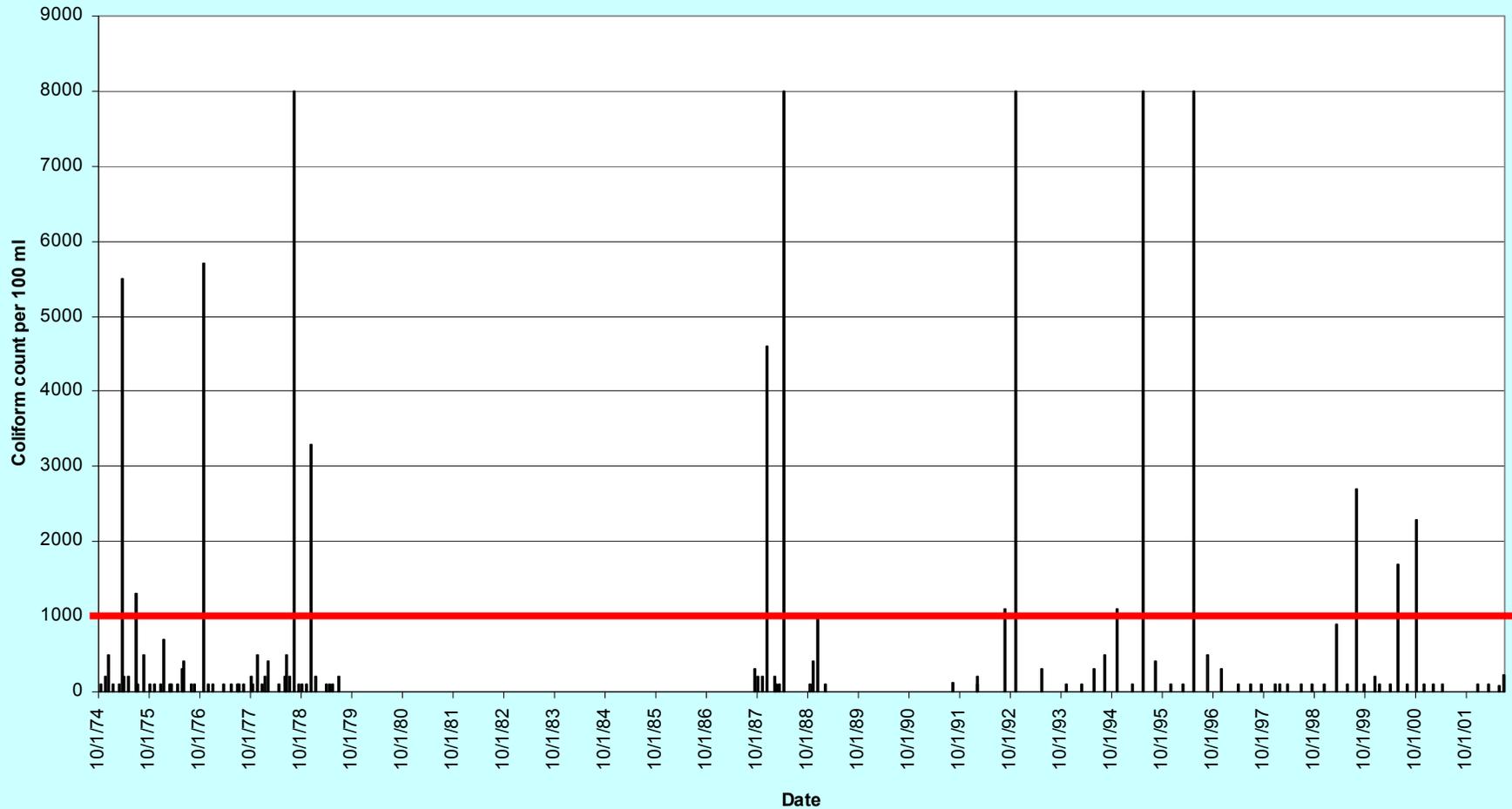
# DEQ Monitoring Data Station 1ACER006.00 Cedar Run



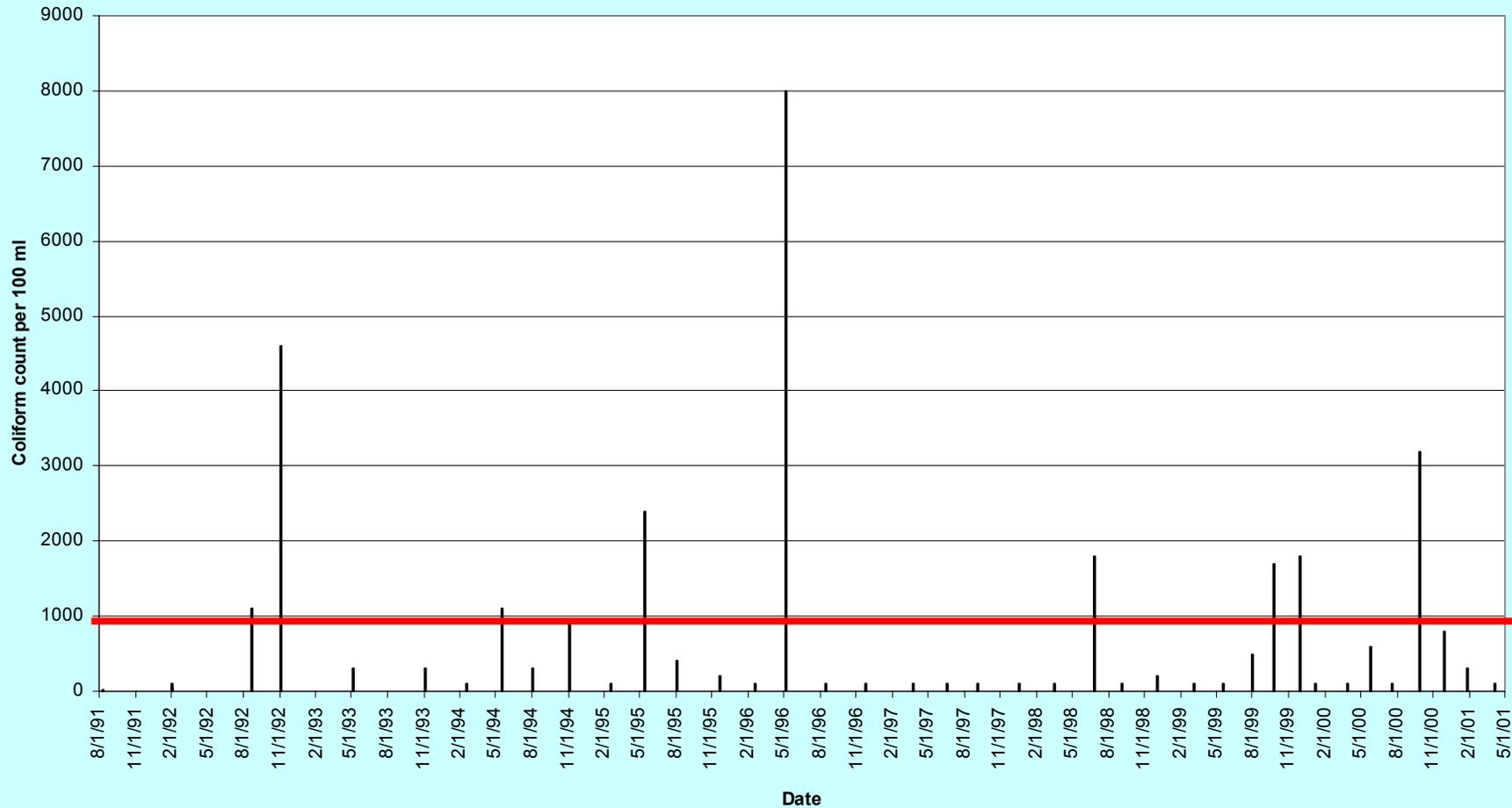
# DEQ Monitoring Data Station 1ACER009.52 Cedar Run



# DEQ Monitoring Data Station 1ACER016.46 Cedar Run



# DEQ Monitoring Data Station 1ACER025.25 Cedar Run



# Cedar and Licking Run TMDL Development

## Land Use Analysis



Flatwood Lane

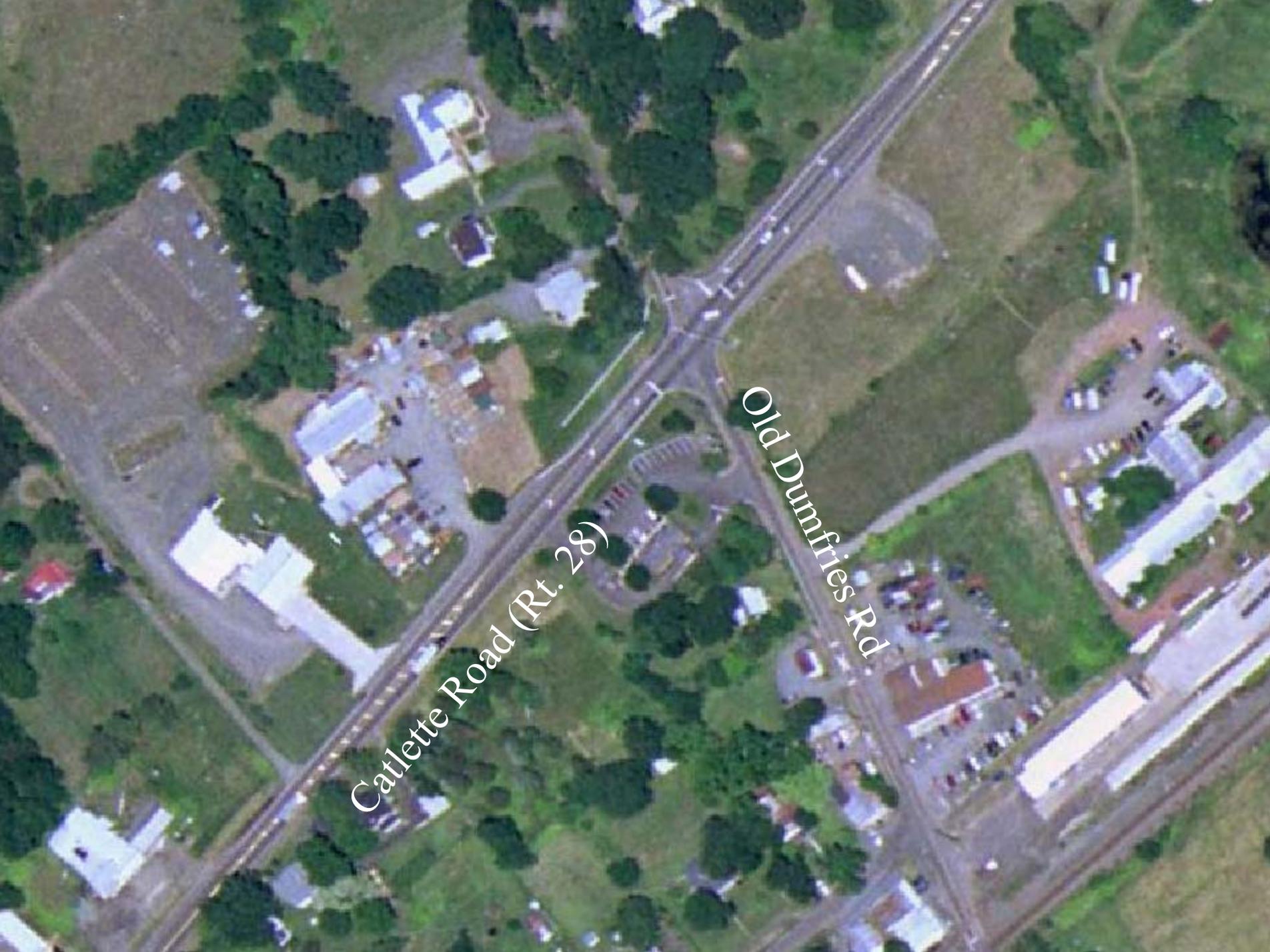
Elk Run Road

Carriage Ford Road



Catlette Road (Rt. 28)

Old Dumfries Rd





Old Dumfries Road

Burwell Road



Old Calverton Road

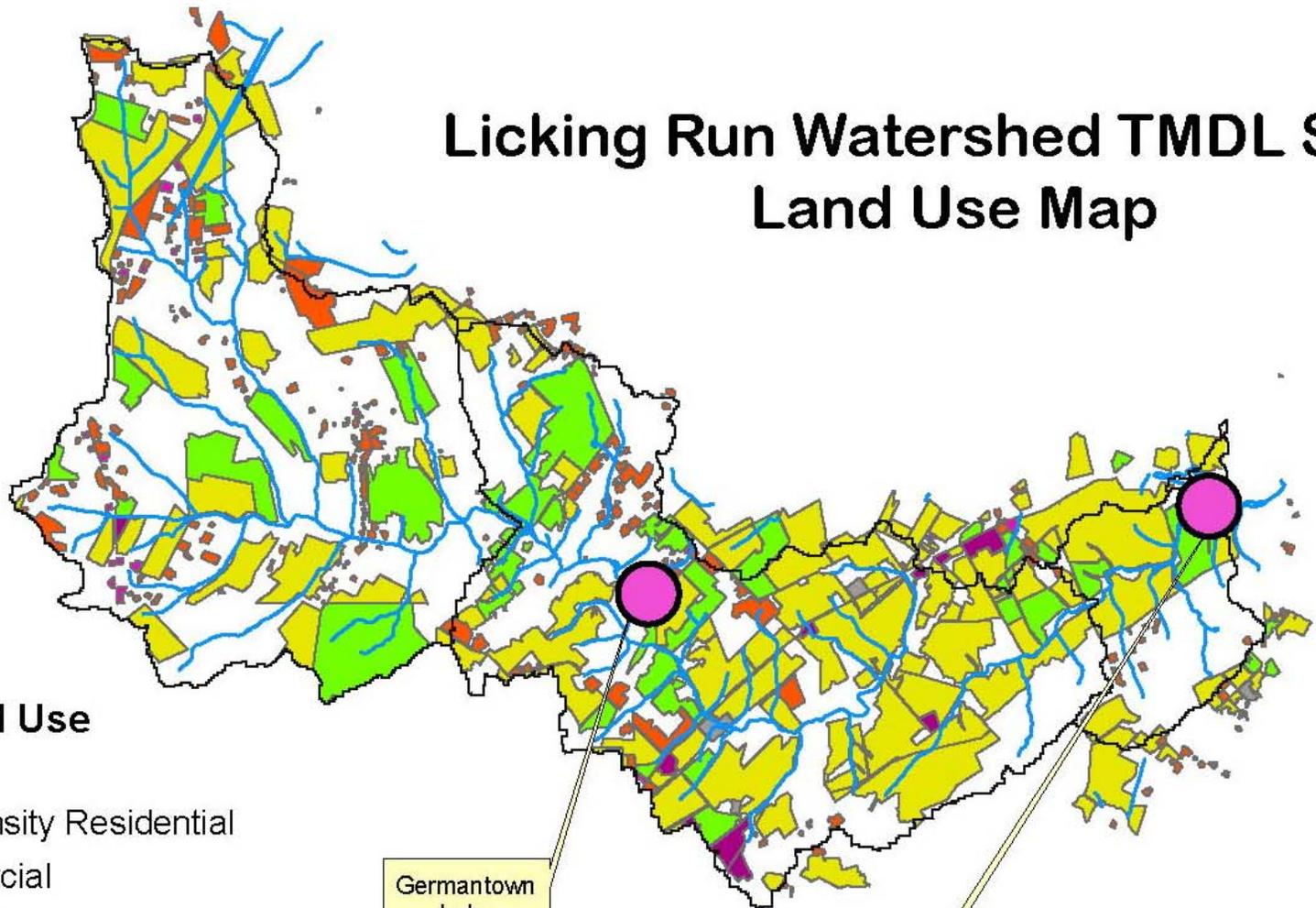
Bristersburg Road

Boteler Road

# Licking Run Watershed TMDL Study Land Use Map

## 2000 Land Use

- Low Density Residential
- Commercial
- Industrial
- Institutional
- Livestock & Pasture
- Tillage
- Forest & Idle



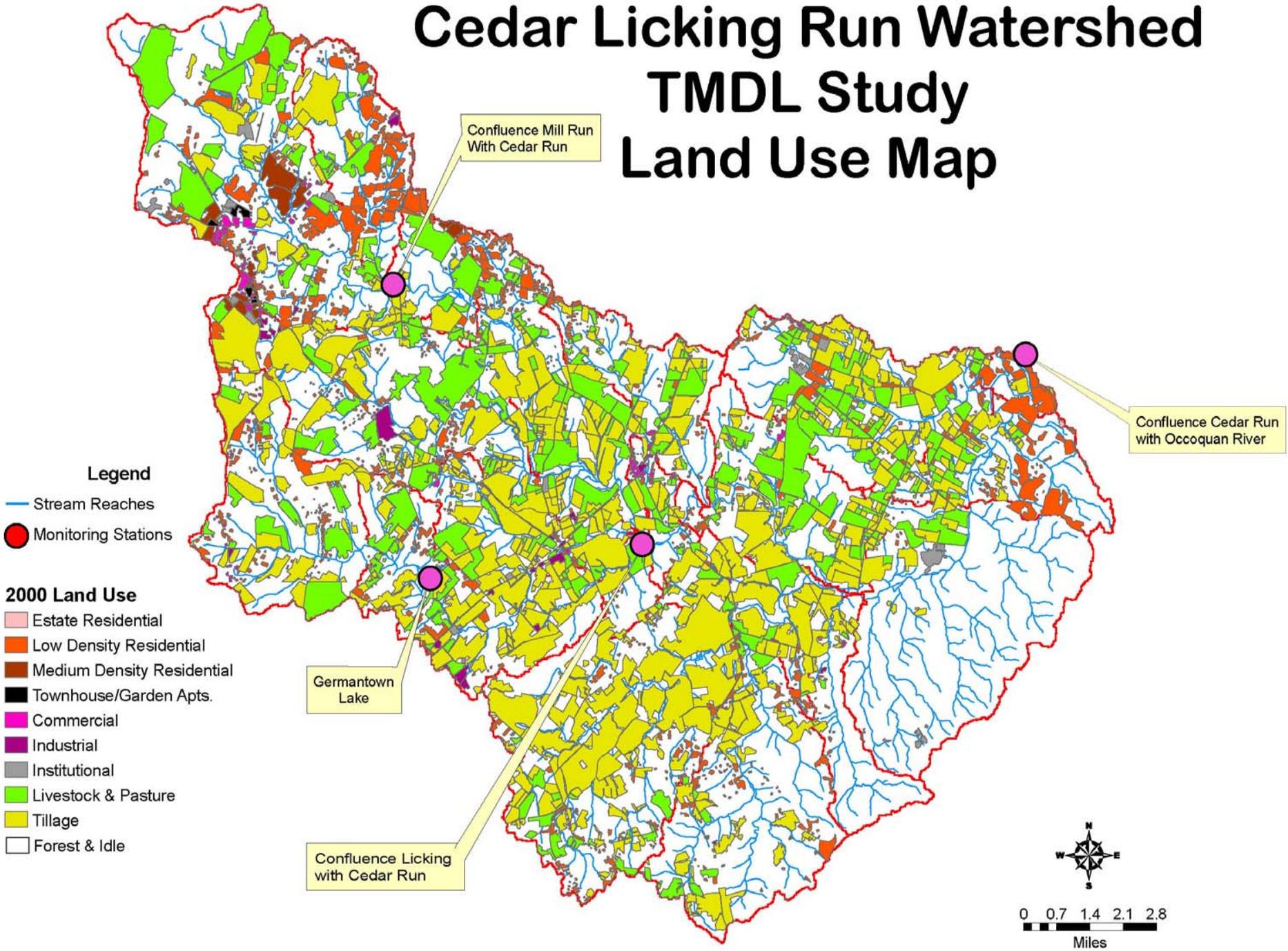
Germantown  
Lake

Confluence Licking  
with Cedar Run

# Licking Run Segment

Urban Lands:	Acres
Low Density Residential	751
Commercial	39
Industrial	101
Agricultural Lands:	
Livestock and Pasture	2,336
Agricultural tillage	6,399
Forest & Idle	6,745
Total Segment Size	16,370

# Cedar Licking Run Watershed TMDL Study Land Use Map



# Cedar Run Segment

Urban Lands:	Total
Low Density Residential	6,600
Medium Density Residential	700
Townhouse	80
Commercial	420
Industrial	390
Institutional	690
	0
Agricultural Lands:	0
Livestock and Pasture	15,900
Agricultural tillage	29,900
Forest & Idle	69,000
Total Segment Size	125,332

# Other Activities

- Stream Survey
  - Canoe Trip
- Data Collection
  - CFAO Permits
  - VPDES Permits
- Information Needs
  - Failing Septic
  - Small CFAO Operations
  - Livestock Populations



# Cedar and Licking Run

## TMDL Development

Contact Info:

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